

James David Brown

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PERSONAL

Date of birth: 15th November 1977

Nationality: British

RESEARCH

- Techniques for assessing and propagating uncertainty in environmental modelling.
- Verification of single-valued, ensemble, and probability forecasts.
- Statistical post-processing and downscaling of ensemble forecasts.
- Hydrologic, hydraulic, and hydro-meteorological forecasting; flood modelling.
- Integrating social and technical perspectives on uncertainty and risk.

EDUCATION

09/99-08/02 **Christ's College, University of Cambridge**

Ph.D. entitled 'Uncertainty propagation through a numerical model of storm surge flooding'. Funding provided by Halifax General Insurance Services Ltd.

09/96-06/99 **University College London**

B.Sc. (with Honours) in Environmental Geography: 1st class and top of faculty.

EXPERIENCE

09/06-present **UCAR Visiting Scientist and then Project Scientist I (10/09)**, Hydrologic Ensemble Prediction group, Office of Hydrologic Development, National Weather Service, NOAA, USA. Led and contributed to research projects on verification of weather and water forecasts, post-processing of ensemble forecasts, ensemble data-assimilation; developed a nationally supported software tool for ensemble verification.

04/03-09/06 **Postdoctoral Research Associate, University of Amsterdam**. Worked on "HarmoniRiB" (Harmonised Techniques and Representative River Basin Data for Assessment and Use of Uncertainty Information in Integrated Water Management), a 5th Framework European project. Acted as Work Package Leader for uncertainty;

- developed techniques and tools for data uncertainty assessment and propagation.
- 09/02-05/03 **Temporary Lecturer in Physical Geography, King's College London.** Designed and taught 'Research Design' for M.Sc. Environmental Monitoring, Modelling and Management (modal student rating 5/5). Designed and taught a Year II course on Global Environmental Change (modal student rating 4/5), lectured on several other courses and led weekly tutorials and seminars.
- 08-10/1999 **Engineering Intern, Risk Management Solutions Ltd., London.** Developed a GIS-based map that charted major flood events in Europe since records began.

TECHNICAL SKILLS

- Computer operating systems: Windows; Linux; UNIX.
- Commercial software: R/S, Erdas Imagine; ArcGIS, Delft-3D; Delft-FLS.
- Programming languages: Java/Swing (expert), R/S, C, Fortran, SQL, scripting.
- Major software authored: Data Uncertainty Engine (<http://www.harmonirib.com>); Ensemble Verification System (<http://amazon.nws.noaa.gov/ohd/evs/evs.html>).

PROFESSIONAL ACTIVITIES

- Scientific reviewer: Natural Environment Research Council (UK), Engineering and Physical Sciences Research Council (UK), Netherlands Organisation for Scientific Research, European Science Foundation, National Science Foundation (USA), National Oceanic and Atmospheric Administration (USA).
- Scientific reviewer (including): *Journal of Hydrometeorology*; *Nonlinear Processes in Geophysics*; *Weather and Forecasting*; *Environmental Modelling and Software*; *Geomorphology*, *Vadose Zone Journal*; *Environmental Science and Technology*; *International Journal of GIS*; *Natural Hazards*; *Society and Natural Resources*.
- Membership: AGU, EGU, AAG, AMS.

HONOURS AND AWARDS

- 04- Invited speaker at various international workshops and conferences.
- 07/08 Best paper published in *Computers and Geosciences* in 2007.
- 06/99 Deans List for the Faculty of Social and Historical Sciences at UCL.
- 06/98 W.R. Mead Prize. (undergraduate degree prize)

REFEREES

References are available upon request.

- Liu, Y., Brown, J.D., Demargne, J., and Seo, D-J. (in press) A wavelet-based technique for assessing timing errors in hydrologic predictions. Accepted for publication in *Journal of Hydrology*.
- Wu, L., Seo, D-J, Demargne, J. and Brown, J.D., Cong, S. and Schaake, J. (in press) Applying mixed-type meta-Gaussian models to precipitation ensemble generation from single-valued forecasts. Accepted for publication in *Journal of Hydrology*.
- Demargne, J., Brown, J.D., Liu, Y., Seo, D-J., Wu, L., Toth, Z. and Zhu, Y. (2010) Diagnostic verification of hydrometeorological and hydrologic ensembles. *Atmospheric Science Letters*, 11(2), 114-122.
- Brown, J.D., Demargne, J., Seo, D-J. and Liu, Y. (2010). The Ensemble Verification System (EVS): a software tool for verifying ensemble forecasts of hydrometeorological and hydrologic variables at discrete locations. *Environmental Modelling and Software*, 25(7), 854-872.
- Brown, J.D. and Seo, D-J. (2010) A nonparametric post-processor for bias correcting ensemble forecasts of hydrometeorological and hydrologic variables. *Journal of Hydrometeorology*, 11(3), 642-665.
- Brown, J.D. (2010) Prospects for the open treatment of uncertainty in environmental research. *Progress in Physical Geography*, 34(1), 75-100.
- Brown, J.D. and Damery, S.L. (2009) Uncertainty and Risk. Invited chapter in Castree, Demeritt, Liverman and Rhoads (eds) *Companion to Environmental Geography*, Blackwell.
- Bruin, S. de, Heuvelink, G. and Brown, J.D (2008) Propagation of positional measurement errors to field boundaries and agricultural operations. *Computers and Electronics in Agriculture*, 63(2), 245-256.
- Heuvelink, G.B.M. and Brown, J.D. (2008) Representing and simulating uncertain environmental variables in GIS. Invited chapter in Shekhar, S. and Xiong, H. (eds) *Encyclopedia of Geographic Information Systems, Science, and Services*, Springer-Verlag.
- Bruin, S. de, Heuvelink, G.B.M., and Brown, J.D. (2008) Propagation of positional measurement errors to field operations. In: Stein, A., Shi, W., and Bijker, W. (eds) *Quality Aspects in Spatial Data Mining*, CRC press, - p. 117 - 130.
- Brown, J.D. and Heuvelink G.B.M. (2008) On the identification of uncertainties in spatial data and their quantification with probability distribution functions. In Wilson, J. and Fotheringham, S. (eds) *A Handbook to GIS*, Blackwell Publishers.
- Mysiak, J., Brown, J.D., Jansen, J.M.L. and Quinn, N.W.T. (2008) Environmental policy aid under uncertainty. *Developments in Integrated Environmental Assessment*, 3, pp. 87-100.
- Heuvelink, G.B.M. and Brown, J.D. (2007) Towards a soil information system for uncertain soil data. In Lagacherie, P., McBratney, A.B. and Voltz, M. (eds) *Digital Soil Mapping. An*

- Introductory Perspective*. Elsevier Developments in Soil Science Series (eds.). Elsevier, Amsterdam, pp. 97-106.
- Brown, J.D. and Heuvelink, G.B.M. (2007) The Data Uncertainty Engine (DUE): a software tool for assessing and simulating uncertain environmental variables. *Computers and Geosciences*, 33(2), 172-190.
- Heuvelink G.B.M and Brown, J.D. and van Loon, E.E. (2007) A probabilistic framework for representing and simulating uncertain environmental variables. *International Journal of GIS*, 21(5), 497-513.
- Brown, J.D., Spencer, T., and Moeller, I (2007) Modeling storm surge flooding of an urban area with particular reference to modeling uncertainties: a case study of Canvey Island, UK. *Water Resources Research*, 43, W06402, doi:10.1029/2005WR004597.
- Heuvelink, G.B.M and Brown, J.D. (2007) Error propagation. Invited contribution to Kemp, K. (ed.) *Encyclopedia of Geographic Information Science*, Sage.
- Refsgaard, J.C., van der Sluijs, J., Brown, J.D., and van der Keur, P. (2006) A framework for dealing with uncertainty due to model structure error. *Advances in Water Resources*, 29(11), 1586-1597.
- Refsgaard, J.C., van der Keur, P., Nilsson, B. Müller-Wohlfiel, D-I, and Brown, J.D. (2006) Uncertainties in river basin data at various support scales - example from Odense Pilot River Basin. *Hydrology and Earth Systems Sciences*, 3, 1943-1985.
- Norton, J.P., Brown, J.D. and Mysiak, J. (2006) To what extent, and how, might uncertainty be defined? Comments engendered by “Defining uncertainty: a conceptual basis for uncertainty management in model4 based decision support” Walker *et al.* Integrated Assessment 4: 1 (2003). *Integrated Assessment*, 6(1): 83-88
- Brown, J.D., Heuvelink, G.B.M. and Refsgaard, J.C. (2005) An integrated framework for recording uncertainties about environmental data. *Water Science and Technology* 52(6): 153–160.
- Brown, J.D. and Heuvelink G.B.M. (2005) Assessing uncertainty propagation through physically based models of soil water flow and solute transport. In Anderson M. G. (ed.) *The Encyclopedia of Hydrological Sciences*, John Wiley and Sons, Chichester, pp. 1181-1195
- Heuvelink, G.B.M and Brown, J.D. (2005) Propagation de l'incertitude en modélisation environnementale avec un SIG. [Uncertainty propagation in environmental modelling with GIS]. In Devillers, R. and Jeansoulin. R (eds.) *Qualité de l'information géographique*, Traité IGAT, série géomatique, Hermes Science Publications Ltd, London, in French
- Refsgaard, J.C., Nilsson, B. Brown, J.D., Klauer, B., Moore, R., Bech, T., Vurro, M., Blind, M., Castilla, G., Tsanis, I. and Biza, P. (2005) ‘Harmonised Techniques and Representative River Basin Data for Assessment and Use of Uncertainty Information in Integrated Water Management (HarmoniRiB)’ *Environmental Science and Policy* 8(3): 267-277

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- Klauer, B. and Brown J.D. (2003) Conceptualising imperfect knowledge in public decision making: ignorance, uncertainty, error and risk situations. *Environmental Research, Engineering and Management*, 1(27), 124-128.
- Brown, J.D. and Damery, S.L (2002) Managing flood risk in the UK: towards an integration of social and technical perspectives. *Transactions of the Institute of British Geographers* 27(4), 412-426. doi:10.1111/1475-5661.00063

ARTICLES SUBMITTED OR IN PREPARATION

- Brown, J.D., Demargne, J., and Seo, D-J. (in preparation) Verification and statistical blending of precipitation forecasts from the NCEP GEFS and SREF models for short-term hydrologic prediction. For submission to *Journal of Hydrometeorology*.
- Brown, J.D., Demargne, J., Liu, Y., Wu, L., Regonda, S. and Seo, D-J. (in preparation) Verification of short-term streamflow forecasts from the Hydrologic Ensemble Forecast System of the U.S. National Weather Service. For submission to *Journal of Hydrology*.
- Brown, J.D. and Seo, D-J. (in preparation) A comparison of statistical post-processors that bias-correct ensemble forecasts of precipitation for use in hydrologic modeling. For submission to *Journal of Hydrometeorology*.
- Demargne, J., Liu, Y., Brown, J.D., Wu, L., Regonda, S. and Seo, D-J. (in preparation) The U.S. National Weather Service Hydrologic Ensemble Forecast System (HEFS): an overview and preliminary evaluation of forecast quality. For submission to *Hydrology and Earth System Sciences*.
- Brown, J.D., Spencer, T. and Moeller, I. (in preparation) A case study on the potential for evaluating flood defenses with portable LiDAR equipment. For submission to *Journal of Geophysical Research*.

CONFERENCES AND WORKSHOPS (INCLUDING INVITED TALKS* AND EVENTS ORGANIZED[#])

- *Brown, J.D. (2011) On the production of reliable and skilful streamflow ensemble forecasts from atmospheric forcing ensembles. Invited presentation to the 91st Annual Meeting of the American Meteorological Society, Seattle, Washington, 23rd – 27th January, 2011.
- Brown, J.D. and Seo, D-J. (2010) A non-parametric post-processor for bias-correcting ensemble forecasts of hydrometeorological and hydrologic variables. Presentation to the European Geosciences Union General Assembly 2010 at the Vienna Center, 6th May, 2010, Vienna, Austria.

- Demargne, J., Liu, Y., Brown, J.D., and Seo, D-J. (2010). Hydrologic ensemble hindcasting and verification in the U.S. National Weather Service. Presentation to the *European Geosciences Union General Assembly 2010* at the *Vienna Center*, 5th May, 2010, Vienna, Austria.
- Liu, Y. and Brown, J.D., Demargne, J. and Seo, D-J. (2010) Analyzing timing errors in hydrologic predictions using the Cross Wavelet Transform (XWT). Presentation to the *European Geosciences Union General Assembly 2010* at the *Vienna Center*, 6th May, 2010, Vienna, Austria.
- Liu, Y., Demargne, J., Brown, J.D, and Seo, D-J. (2010) Uncertainty Assessment of Hydrologic Ensemble Forecasts via Verification to Support Risk-Based Decision Making. Presentation to the *American Society of Civil Engineers' Environmental & Water Resources Institute, World Environmental & Water Resources Congress*, May 18th, 2010, Providence, Rhode Island, USA.
- Liu, Y. and Brown, J.D., Demargne, J. and Seo, D-J. (2009) Analyzing timing errors in hydrologic predictions using the Cross Wavelet Transform (XWT). Presentation to the *NCAR Ensemble and Cloud Verification Workshop* at the *National Center for Atmospheric Research*, 17th August, 2009, Boulder, CO.
- Brown, J.D. and Seo, D-J. (2009) Bias-correcting ensemble forecasts of hydrometeorological and hydrologic variables: a non-parametric approach. Presentation to the *HEPEX Special Topics Workshop on Downscaling of Atmospheric Forecasts for Hydrologic Prediction* at *Meteo France*, 17th June, 2009, Toulouse, France.
- Brown, J.D. (2009) The Ensemble Verification System (EVS): a software tool for verifying ensemble forecasts of hydrometeorological and hydrologic variables at point locations. Presentation to the *Fourth International Verification Methods Workshop* at the *Finnish Meteorological Institute*, June 8th, 2009, Helsinki, Finland.
- Demargne, J.D. and Brown, J.D. (2009) Communicating hydrologic verification information for operational forecasting and real-time decision making in the U.S. National Weather Service. Poster presentation to the *Fourth International Verification Methods Workshop* at the *Finnish Meteorological Institute*, June 8th, 2009, Helsinki, Finland.
- *Brown, J.D. (2009) Quantitative evaluation of probabilistic prediction systems with observations. Invited presentation to the *HYACINTS workshop on Uncertainty in Climate Change Impacts on Water Resources* at *Geocenter Copenhagen*, September 10th, 2009, Copenhagen, Denmark.
- #Heuvelink, G.B.M and Brown, J.D. and (2009) International Ph.D. workshop on Assessment and Propagation of Uncertainty in Spatially Distributed Environmental Modelling at *Geocenter Copenhagen*, September 8th-11th, 2009, Copenhagen, Denmark.
- #Heuvelink, G.B.M and Brown, J.D. and (2009) Geospatial information sciences workshop on spatial uncertainty propagation at the *University of Texas, Dallas*, May 1st, 2009, Dallas, Texas, USA.

- Brown, J.D. and Seo, D-J. (2008) A non-parametric post-processor for bias correcting ensemble forecasts of hydrometeorologic and hydrologic variables. Poster presentation at *American Geophysical Union Fall Meeting, 15th – 19th December, 2008, San Francisco, CA, USA*.
- Heuvelink, G.B.M and Brown, J.D. (2008) Pre-conference workshop on spatial uncertainty propagation at the *8th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences, 23rd-27th June, 2008, Shanghai, China*.
- Schaake, J., Hartman, R., Brown, J.D., Seo, D-J., and Regonda, S. (2008) A post-processor for hydrologic ensemble forecasts. Presentation to the *European Geosciences Union, April 17th, 2008, Vienna, Austria*.
- Brown, J.D. and Charles, M. (2008) Ensemble verification for model developers. *Presentation at the NCEP Ensemble User's Workshop, 13th May, 2008, Washington DC, USA*.
- [#]Heuvelink, G.B.M and Brown, J.D. and (2007) Pre-conference workshop on uncertainty propagation at *Pedometrics 2007, 27th – 30th August, Eberhard Karls Universität, Tübingen, Germany*.
- ^{*}Heuvelink, G.B.M and Brown, J.D. (2005) Handling spatial uncertainty in GIS: development of the Data Uncertainty Engine (DUE). Keynote presentation at *GISPlanet 2005, May 30 - June 2, Lisboa, Portugal*. Paper published in *Proceedings of GISPlanet, Estoril, Portugal*.
- Norton J.P., Brown, J.D. and Mysiak, J. (2005) Uses and Limitations of Uncertainty Assessment in Model-based Decision Support. Presentation at *International Symposium on Environmental Software Systems 2005, May 24-27, Sesimbra, Portugal*. Paper published in *International Symposium on Environmental Software Systems 2005, May 24-27, Sesimbra, Portugal*
- Brown, J.D. and Heuvelink, G.B.M (2004) Assessing and recording uncertainties about environmental data. Invited for extended presentation at the *International Symposium on Spatial Data Quality (ISSDQ), 15th – 17th April, Bruck an der Leitha, Austria*. Paper appeared in Frank, A and Grum, E. (eds) *Proceedings of the International Symposium on Spatial Data Quality 2004*. Yellow Book Series, No. 28, TU Vienna
- Heuvelink, G.B.M and Brown, J.D. (2004) Towards a soil information system for uncertain data. Presentation at the *Global Workshop on Digital Soil Mapping 2004, September 14th – 17th, Montpellier, France*.
- ^{*}Brown, J.D. and Heuvelink, G.B.M. (2004) An integrated framework for assessing uncertainties in environmental data. Invited contribution to the *International Symposium on Uncertainty and Precaution in Environmental Management 2004, June 7th – 9th, Copenhagen, Denmark*.
- van Loon, E.E., Brown, J.D. and Bouten W. (2004) Collateral damage – the unpleasant side-effects of ignoring observation errors in water balance calculations. Presentation and paper in Teuling A.J., Leijnse, H., Troch, P.A., Sheffield, J. and E.F. Wood (eds) *Proceedings of the 2nd international CAHMDA workshop on The Terrestrial Water Cycle Modelling and Data Assimilation Across Catchment Scales, October 25th, Princeton, NJ, USA*.

- Brown, J.D. and Heuvelink G.B.M (2004) An integrated framework for assessing uncertainties in environmental data, illustrated for different types of data and different complexities of problem. Paper presented at *Accuracy 2004: 6th International Symposium on Spatial Data Accuracy, June 28th, Portland, Maine, USA*.
- van der Keur, P., Refsgaard, J.C., van der Sluijs, J., and Brown, J.D. (2004) A framework for dealing with uncertainty due to error in model structure. Presentation at *American Geophysical Union Fall Meeting, December 13th, San Francisco, USA*.
- Klauer, B. and Brown J.D. (2003) Conceptualising imperfect knowledge in public decision making: ignorance, uncertainty, error and risk situations. Paper presented at *Sustainability Indicators and Intelligent Decisions (SIID) 2003, 9th October, Vilnius, Lithuania*.
- Vrugt, J.A., Bouten, W. and Brown J.D. (2003) Merging the strengths of global optimisation and data assimilation to simultaneously estimate parameter values and state variables in hydrologic models. Paper presented at *Hydrological risk: recent advances in peak river flow modelling, prediction and real-time forecasting. Assessment of the impacts of land-use and climate change, October 24th, Bologna, Italy*, and published in conference proceedings (Proceedings of the ESF LESC Exploratory Workshop).
- Brown, J., Thomalla, F., Kelman, I., Möller, I., Spence, R. and Spencer, T. (2002) Towards long-term flood management on Canvey Island, UK. Paper presented at the *98th Annual Meeting of the Association of American Geographers 2002, 19th March 2002, Los Angeles, California, USA*.
- Kelman, I., Thomalla, F., Brown, J., Möller, I., Spence, R. and Spencer, T. (2002) Coastal flood risk assessment in England. *Philosophical Transactions, Royal Society of London A360: 1553-1554*.
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- Thomalla, F., Brown, J., Kelman, I., Möller, I., Spence, R. and Spencer, T. (2002) Towards an integrated approach for coastal flood impact assessment. Paper presented at *ASCE Solutions to Coastal Disasters Conference 2002, February 24th, San Diego, California, USA* and published in Ewing, L. and L. Wallendorf (eds) *Proceedings of the Solutions to Coastal Disasters 2002 Conference, San Diego, California, USA*.
- Thomalla, F., Brown, J., Kelman, I., Möller, I., Spence, R. and Spencer, T. (2001) Coastal flood risk assessment in England. Poster presentation at *Flood Risk in a Changing Climate, 21st November, Royal Society, London, UK*.
- Thomalla, F., Brown, J., Kelman, I., Möller, I., Spence, R. and Spencer, T. (2000) Coastal Settlements at Risk: A study of England's East Coast. *Kassel Reports of Hydraulic*

Engineering. Proceedings of the Kassel International Symposium on Flood Defence, University Gesamthochschule Kassel, 20th September. Kassel Reports of Hydraulic Engineering No. 9/2000: F263-2737.

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